

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID-SEMESTER EXAMINATION SP2023)

CLASS: BTECH
BRANCH: PIE

SEMESTER: IV
SESSION: SP2024

SUBJECT: PE216 FOUNDRY, FORMING & WELDING TECHNOLOGIES
TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

-
- | | | | |
|--|-----|-----|------------|
| Q.1(a) When will you select a casting process to manufacture a component? Justify | [3] | CO | BL |
| Q.1(b) Enlist at least 5 important properties required of a molding sand. Also, explain why the particular property affects the casting process. | [2] | CO1 | BL5
BL1 |
| | | | |
| Q.2(a) Design a pattern for the part shown in Fig 1 using the following allowances: Machining allowance: 2 mm for the circular hole and 3 mm for all other dimensions, Shrinkage allowance: 4% for the circular hole, and 3% for all other dimensions. All dimensions are in mm. | [3] | CO1 | BL6 |

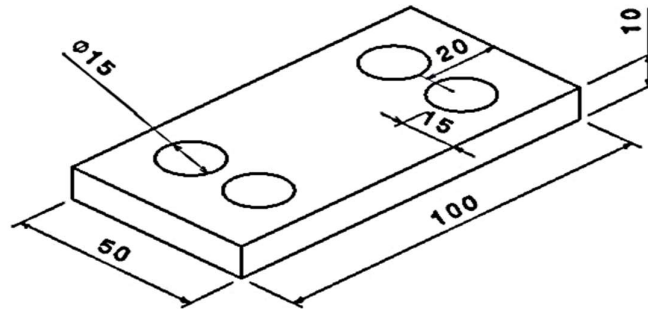


Fig 1: Cast component

- | | | | |
|---|-----|-----|-----|
| Q.2(b) Can a chaplet also be an internal chill? Critically analyze. | [2] | CO1 | BL5 |
| | | | |
| Q.3(a) Analyze the reasons for hot tearing in castings. | [2] | CO1 | BL5 |
| Q.3(b) A riser in the shape of a sphere is to be designed for a sand-casting mould. The casting is a rectangular plate, with length = 200 mm, width = 100 mm, and thickness = 18 mm. If the total solidification time of the casting itself is known to be 3.5 min, design the riser so that it will take 25% longer for the riser to solidify. | [3] | CO1 | BL6 |
| | | | |
| Q.4(a) Differentiate between <i>lost wax casting (investment casting)</i> and <i>lost foam casting (Evaporative pattern casting)</i> . | [3] | CO2 | BL4 |
| Q.4(b) Explain the true centrifugal casting process. | [2] | CO2 | BL1 |
| | | | |
| Q.5(a) What are the different types of welding joints? | [2] | CO3 | BL1 |
| Q.5(b) Compare and contrast forward and backward welding. | [3] | CO3 | BL4 |